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PAHSIMEROI VALLEY

LONGITUDINAL SUBSISTENCE-SETTLEMENT

AND

LAND USE STUDY

James C. Chatters

Report No. 4

USDA Forest Service
Intermountain Region
Ogden, Utah
1976

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Introduction

The following paper constitutes the preliminary report of Phase I of the Pahsimeroi Valley Longitudinal Subsistence-Settlement and Land Use Study. The research to be described here was undertaken to provide data for the Ph.D. dissertation of James C. Chatters, who is working under the auspices of Dr. R. C. Dunnell of the Department of Anthropology, University of Washington, Seattle, Washington.

The project consists of an intensive survey of portions of the upper Pahsimeroi River Valley of east central Idaho and was made possible through the courtesy of the United States Departments of Agriculture and Interior (Permit No. 74-ID-027).

The actual fieldwork was accomplished between June 20 and July 21, 1974. Work was directed by J. C. Chatters working with a crew of four field assistants including Barbara Chatters and three University of Washington students, J. Russell Hanley, Donald J. Pint, and Linda Usita, for whom the experience constituted a part of a course in archeological field methods. Funding for the project was provided entirely by the participants.

Because this is merely a preliminary report of the work performed under U.S. Government land use permits, the research problem, overall strategy of the project, and the data collection technique will only be outlined here. These will be presented in detail in a final report to the Smithsonian Institution, the USDI, and the USDA in form of a Ph.D. dissertation. Analysis of artifacts recovered during this first season has not yet begun and the conclusions presented are, therefore, based on only brief observation and are subject to total revision.

The Problem

The present study is concerned with the phenomena of development and change in subsistence and settlement systems and land use patterns and with the effects of different land use strategies on the environments in which they are practiced. The research involved in Phase I of the project consists of an investigation of the feasibility of solving a two-pronged problem including:

1. The definition of historic and prehistoric subsistence settlement systems and land use patterns in a specific region and the identification of changes in these patterns as a possible consequence of environmental and technological change.

2. A comparison of various Euro-American and historic and prehistoric aboriginal land use practices including principally a consideration of the effects of each on the same local ecosystem.

The ultimate objective of this project is to determine whether the science of prehistory may be employed in land use planning programs which have maximum efficiency of utilization as their goal.

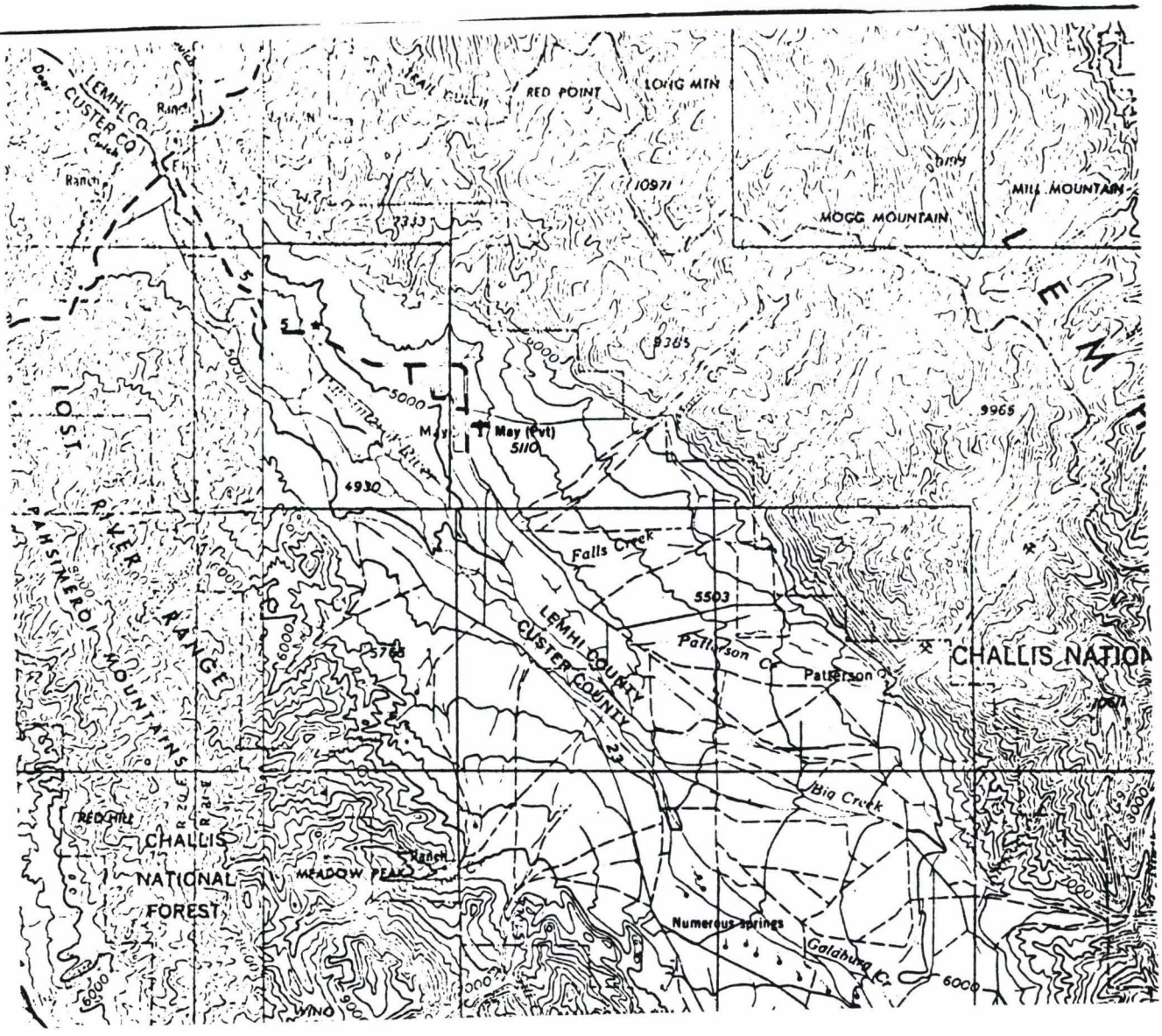
The complex nature of the problems being investigated placed strict limits on the kind of area in which this study could take place. There are essentially four criteria which had to be met by the study region. First, it must contain surface artifacts of aboriginal and Euro-American origin in sufficient quantity to permit the rapid elucidation of subsistence and settlement patterns. Secondly, if the entire subsistence system for at least one time period is to be defined, the region should be sufficiently diverse ecologically to permit the assumption that it could entirely meet the annual resource needs of a population. Third, for the study of relative stability and change in past ecosystems, diverse sources of paleoenvironmental information should exist. Finally, the area to be studied should be one in which both historic and prehistoric environmental, technological, and cultural changes are known to have occurred.

At the onset of this study, it was surmised that the drainage basin of the Pahsimeroi River met the requirements of the research problem.

The Pahsimeroi River Valley (fig. 1) is a long, broad, relatively open tectonic basin bounded on east, south, and west by mountains reaching to well over 10,000 feet and on the north by the canyon of the Salmon River. Altitude ranges from 5,000 feet at the Salmon River confluence to the over 12,000-foot Borah Peak and rainfall tends to increase with elevation from 3-7 inches in the valley bottom at May, Idaho, to 15-20 inches near the high mountain crests. Altitude and rainfall combine with ground water location to support a series of floral regimes which includes, as one proceeds from river to mountain crests, marsh, sagebrush steepe, semi-arid grassland (in some areas), montane brush, conifer forests, and finally alpine tundra (pls. 1 and 2). The faunal component is rich and diverse and includes, among other animals, anadromous fish and five species of big game differing markedly in habitats and seasonal behavior patterns.

With such diversity in flora and fauna and the relative isolation of the valley, it is possible that some prehistoric subsistence systems may have operated soley within its bounds.

Prehistoric and historic artifacts are plentiful in the area. The archeological survey of the Salmon District of the Bureau of Land Management in 1966 succeeded in locating a large number of prehistoric sites in the valley which spanned the full range of the postglacial period (Swanson, King, and Chatters 1969). Additionally, the author during that survey, noted the presence of Euro-American artifacts and such potential sources of paleoenvironmental information as packrat (Neotoma comerea) nests, high mountain lakes and spring bogs.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LEMHI COUNTY
CUSTER COUNTY
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Patterson Cr
CHALLIS NATIO
Big Creek
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FOREST
MEADOW PEAK
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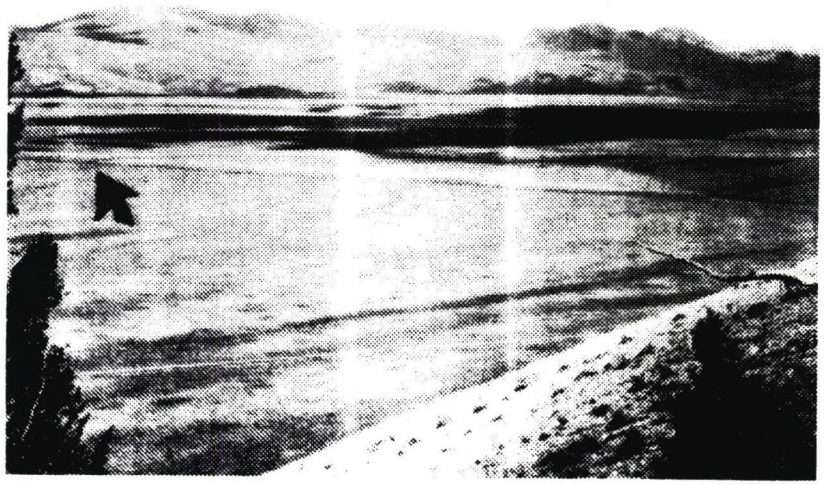

Plate 1: View, looking southwest of the Upper Pahsimeroi Valley from the vicinity of transect Bs. The location of Transect B2 is indicated by the arrow at left center of picture.

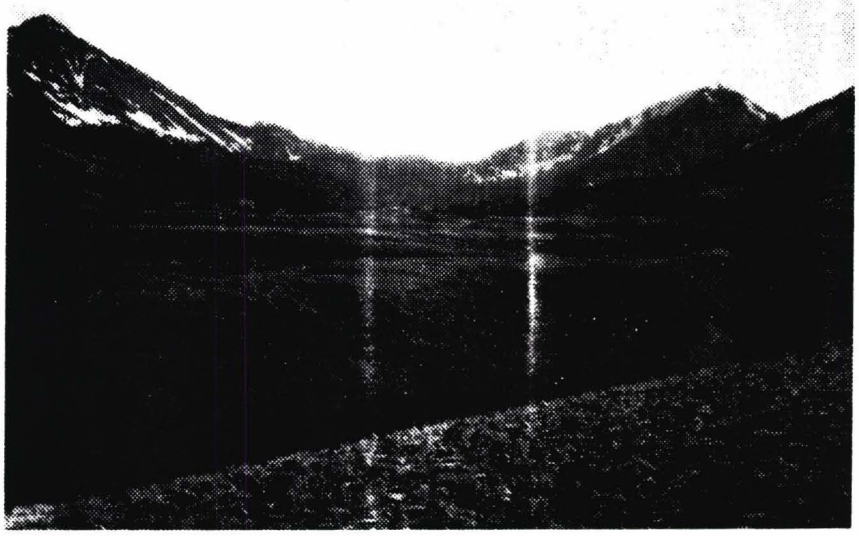

Plate 2: The basin of Mahogany Creek (Tract C) from above Transect A1. Note the floral progression from sagebrush-bunchgrass steppe (foreground) to the barren summit of Borah Peak (upper left).

Although little concerned with the Pahsimeroi Valley itself, other archeological, ethnographic and geological studies in the area suggest changes in environment and culture which are of importance to this project. First, research in the Lemhi and Birch Creek Valleys and on the Snake River Plain (to the east and south of the Pahsimeroi respectively) documents marked climatic alteration during the Holocene in east central Idaho. The Anatherman period (Antevs 1948), post Pinedale to about 7,000 BP, was relatively cool and damp and a sub-humid prairie appears to have existed in the area as indicated by fauna from Jaguar Cave (Sadek Kooros 1972; Kurten and Anderson 1972; Guilday and Adam 1967) and the Wasden site (Butler 1972; Guilday 1969). Beginning at about 7,000 BP a period of desiccation which changed the environment to an arid artemesia steepe (the onset of the Altithermal) can be identified in the Wasden site and various rockshelters in the Birch Creek Valley (Swanson 1972). This period ended around 4,000 BP with a slight cooling trend associated with Medithermal neoglaciation in the Lemhi Mountains (Dort 1962), although the environment is still semi-arid.

These Climatic changes clearly altered the content or elevation of floral and faunal communities in east central Idaho. Working from the assumption that the subsistence and land use patterns will conform to the patterns of resource distribution, it can be expected that these patterns had been altered in response to such changes. The author did note in 1966 that a change in artifact distribution in the Pahsimeroi Valley appeared to have occurred although neither the precise time nor nature of the change was discerned.

In addition to these temporal differences in prehistoric remains, another shift in the use of the valley is noted when archeological and ethnographic information are compared. According to Julian Steward's informants, in the 19th century, little use was made of the Pahsimeroi Valley aside from winter pronghorn hunting (1938). The innovation which could have occasioned this modification of the land use strategy from relatively heavy use observed for prehistoric times to light use in the 19th century is the advent of horse pastoralism. Horse keeping is a technological change which allowed greater mobility, caused increased warfare, required different resources (pasturage) and is, therefore, likely to have wrought marked changes in traditional lifeways.

Finally, of special importance to this study is the late nineteenth century removal of the native population from central Idaho to reservations at Tendoy and Fort Hall. Euro-Americans entered the area at this time, developing their own techniques for exploiting the valley.

These kinds of changes in climate, technology, and finally in race and cultural tradition, coupled with the potentialities of the Pahsimeroi River Valley for paleoecological and archeological studies, should make it possible to study:

1. The development of a subsistence-settlement system in the region beginning with the first Paleo-Indian occupation.

2. The systems' responses to environmental and technological changes.

3. The development of a new system of settlement and land use by Euro-Americans whose history is known.

4. A comparison of the aboriginal and Euro-American land use practices.

5. The effects of this series of exploitive systems on the local ecosystem itself.

The purpose of Phase I is to determine if the information required for this kind of study can actually be acquired in the Pahsimeroi Valley.

Research Strategy and Field Tactics

Research Design

The Pahsimeroi Valley project is tentatively planned to be accomplished during two field seasons, although this time period may be extended. The actual data acquisition will ultimately involve intensive surface survey, excavation of stratified and unstratified habitation sites, and the collection of paleoecological information by a variety of means.

Phase I of the project, reported here, consists of a preliminary investigation of the study area. The work of the 1974 season focused on the northern point of a mountain range known as Donkey Hills (fig. 2). Activities of this study included:

1. Intensive surface survey to obtain artifacts and their locations.

2. The identification and mapping of modern floral and faunal communities to facilitate the microenvironmental stratification of the area required by the intensive survey method.

3. The location of sites containing buried occupations with abundant faunal remains and stratified occupations (to improve the local chronology).

4. Location of sites which potentially contain floral and faunal information of value in paleoecological studies.

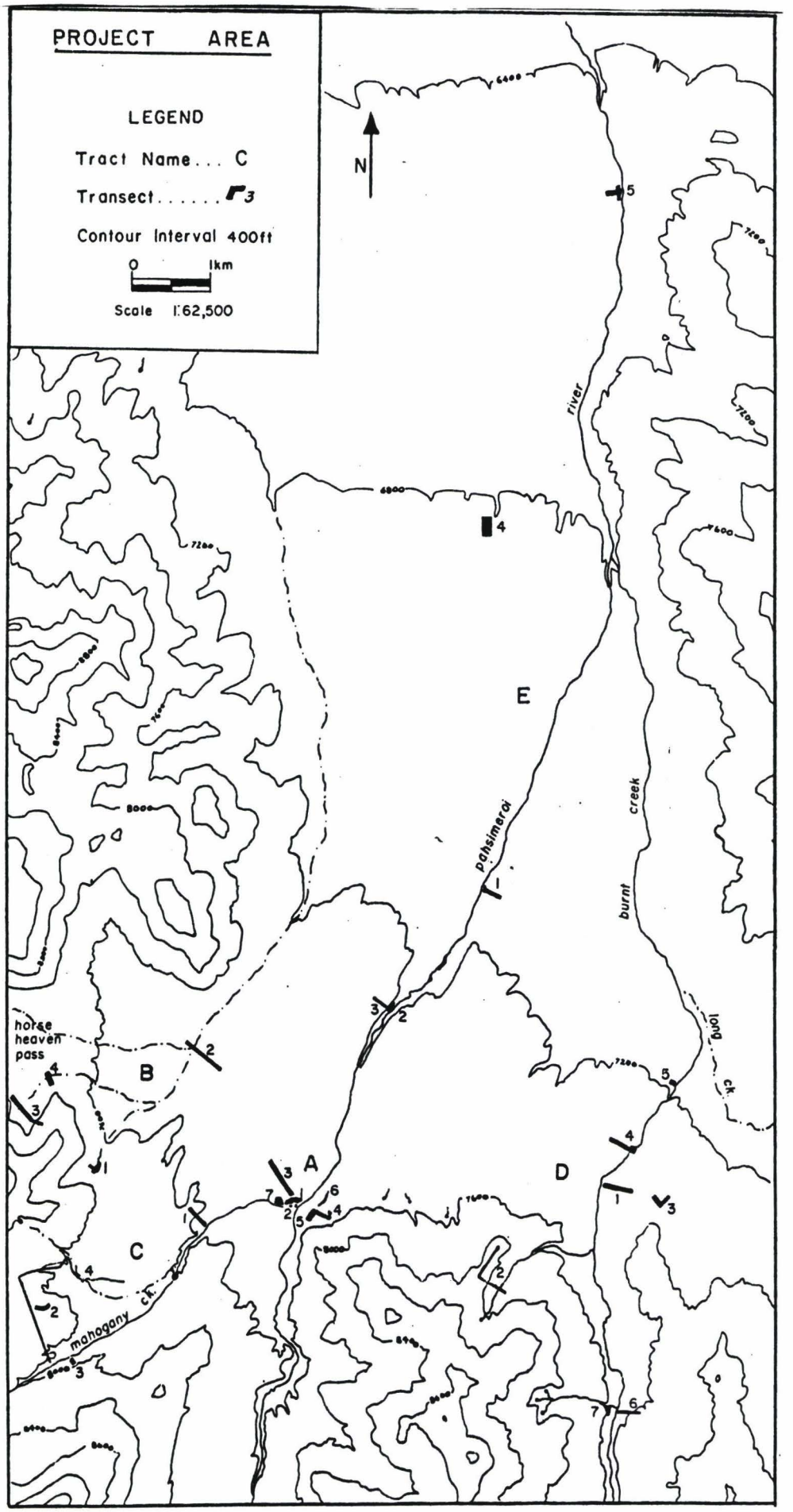

Figure 2. The Pahse I Project Area displaying the locations of tracts and transects.

Intensive surface survey is the field method which has produced the best results in subsistence-settlement system studies (of Dancey 1973, Thomas 1973). The specific procedure used in this instance is termed siteless survey. Siteless survey is a method in which the entire surface of a specific area is searched with the precise locations and microenvironmental relationships of all individual artifacts, not just artifact concentrations, recorded and all artifacts collected. This type of method is most productive for use with the kind of functional analysis which will be employed. This utility stems from its environmental orientation and its precise location capabilities. Artifacts are individually located which improves the opportunity for separating the components of sites occupied during more than one time period. Methods which involve the collection artifacts by "site" will inextricably mix components and are likely to neglect individual scattered artifacts which represent minor activity loci.

Most kinds of intensive survey which cover areas as large as the Pahsimeroi Valley involve some sort of sampling design. The most effective design to use with subsistence-settlement studies is stratified transect sampling. Plog (1972) has shown this technique to account for the greatest variability in regional artifact distributions by virtue of its coverage of both the interior of environmental strata and the interfaces, or ecotones, between them.

Microenvironmental stratification, in studies concerned with prehistoric orientation, is ordinarily based on classes of topographic features. This is justified by the fact that, although vegetational communities clearly bear a close relationship with subsistence activities, they are subject to rapid change. Though today's plant distributions could conceivably be identical with those of the past, the assumption that this is always the case is unwise. It is assumed, however, that because topographic features often condition vegetational zonation, they are likely to have had a similar relationship with prehistoric plant communities, and therefore, subsistence systems.

Prior to the research of Phase I, insufficient information was available on the study region to permit its proper microenvironmental stratification on the basis of topography. Part of the purpose of this phase was, therefore, the identification and definition of archeologically meaningful environmental zones. This was accomplished by placing sample transects where they would crosscut the majority of the topographic features which could be perceived in any given locale. The results of this process will be used to identify those classes of topographic features which are archeologically meaningful, that is, the topographic zones which were virtually identical when viewed through the subsistence strategy of the area's former inhabitants. From this work a statistically meaningful stratified transect sampling design will be developed and employed in later surface investigations.

Location of Sample Transects

It had been originally planned that sample transects would be placed within seven topographically diverse areas chosen through a study of topographic maps and aerial photos. Taken as a group, these areas, called tracts, were believed to encompass the total topographic variability observed within the upper part of the Pahsimeroi Valley. In practice, logistic considerations including accessibility, surface exposure, and the activities of amateur artifact collectors necessitated a change in the location of most sample tracts. The upshot of this was that a number of topographic areas, including those of the high mountains and more northerly tributary canyons were not sampled this season.

Ultimately, a set of five sample tracts, A through E were studied (fig. 2). These covered the areas of major and minor stream basins, the broad, alluvial valley bottom, a mountain pass, and the interfaces between them. Each transect included an easily bounded region such as a stream basin with an area from 4 to 30 km^2.

Four to seven collection transects were placed within each tract. In most instances these were linear rectangles of 100 to over 3,000 m in length and were placed in such a way that they intersected a number of topographic features. In a few specific instances, "transects" conformed to single features which were of special interest or which had been overlooked in earlier transect placement.

With but two exceptions, when transects were located for coverage of specific kinds of artifact clusters, the placement of transects was completely random. The author simply studied maps and aerial photos or observed the landscape for areas in which transects might be most advantageously placed to cover specific sorts of topography.

Transects were demarketed on the land surface by the placement of rock cairns, stakes, or by natural features such as boulders and abrupt changes in topography (e.g. streams). A planimetric map was made of each transect, on which topographic features were indicated by "eyeballed" contour lines. All maps were made by compass triangulation from a set of datum cairns at a scale of 1:1000. In addition to topographic features, vegetational communities and artifact distributions were drawn on these maps (fig. 3). Each transect was tied by triangulation into the overall referential (mapping) system of the project. This referential system consisted of USGS 1:24,000 and 1:62,500 scale topographic maps (specifically Burnt Creek, and Donkey Hills, Idaho).

Data Collection

Once transects had been laid out, they were totally searched for artifacts. The entire field crew, walking parallel lines at intervals of under 2 m

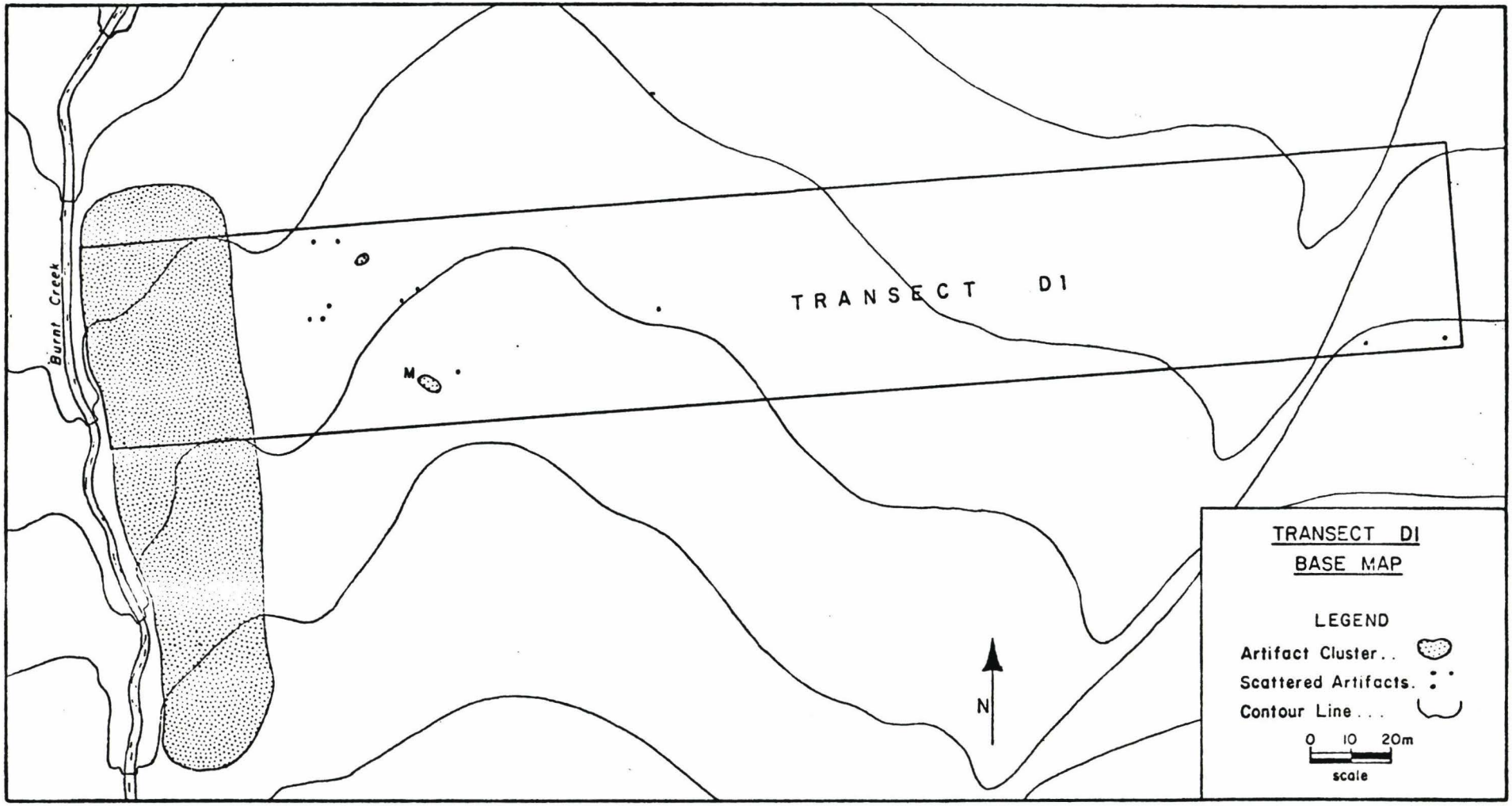

Figure 3. Base map of Transect D1 including overall artifact distributions.

crisscrossed the tract surface. When artifacts, including stone, tools, fire broken rock, artifactual bone, wood, and Euro-American trash were found they were marked with flagged metal pins. When clusters of artifacts with densities above 1 per square m were encountered, only their peripheries were tagged. Artifact distributions could thus be observed in precise environmental position prior to their collection.

Artifact location was accomplished by one of three methods, depending on artifact density and the size of artifact clusters. Triangulation, with its lack of precision but relative speed, located artifacts when their density did not exceed 1 per 8 square m. Locations of triangulated artifacts were marked on transect base maps and were numbered consecutively for the entire transect. Clusters of artifacts, traditionally called sites, which had densities of greater than 1 per 8 square m but under 1 per square m were located and numbered on maps of 1:100 scale by a datum-based radiation offset technique. The datum was then located on the transect base map. Figure 4 presents an example of a radiation offset map.

When the density of artifact clusters exceeded 1 per square m covering an area greater than 20 m^2 both artifact tagging and radiation offset became impractical. Collection and recording in such instances was by a grid of m intervals (pls. 3 and 4). Grids were also datum-based and tied into the base map by triangulation. The result of these procedures was that each artifact found during the survey is recorded to within 1 m of its original location. This level of precision will allow the precise topographic placement of every artifact for settlement and land use study and will also permit the clear separation of artifact clusters required for chronological ordering.

Features, nonportable, nondiscrete artifacts such as rock cairns and fire hearths were mapped at a scale of 1:50 and tied into the base map.

In addition to artifacts, other kinds of data were recorded from each transect. Plant communities were located on base maps and notation was made of the kinds of animals which inhabited or had recently passed through the transect. Faunal remains of recent derivation were collected when encountered, if not too fresh. Information was also collected on soils, native rock which may have been available for tools, and access to resources which the area would have afforded its occupants. To facilitate chronological ordering and functional placement of artifact clusters, soil samples were collected from within each small cluster and at 10 m intervals in larger clusters at a depth of 15 cm below surface. These are to be subject to analysis for ph and organic phosphate content.

Finally, to control for biases introduced into the data by the field workers themselves, information on weather, general surface visibility, and moods of crew members was noted for various times each day.

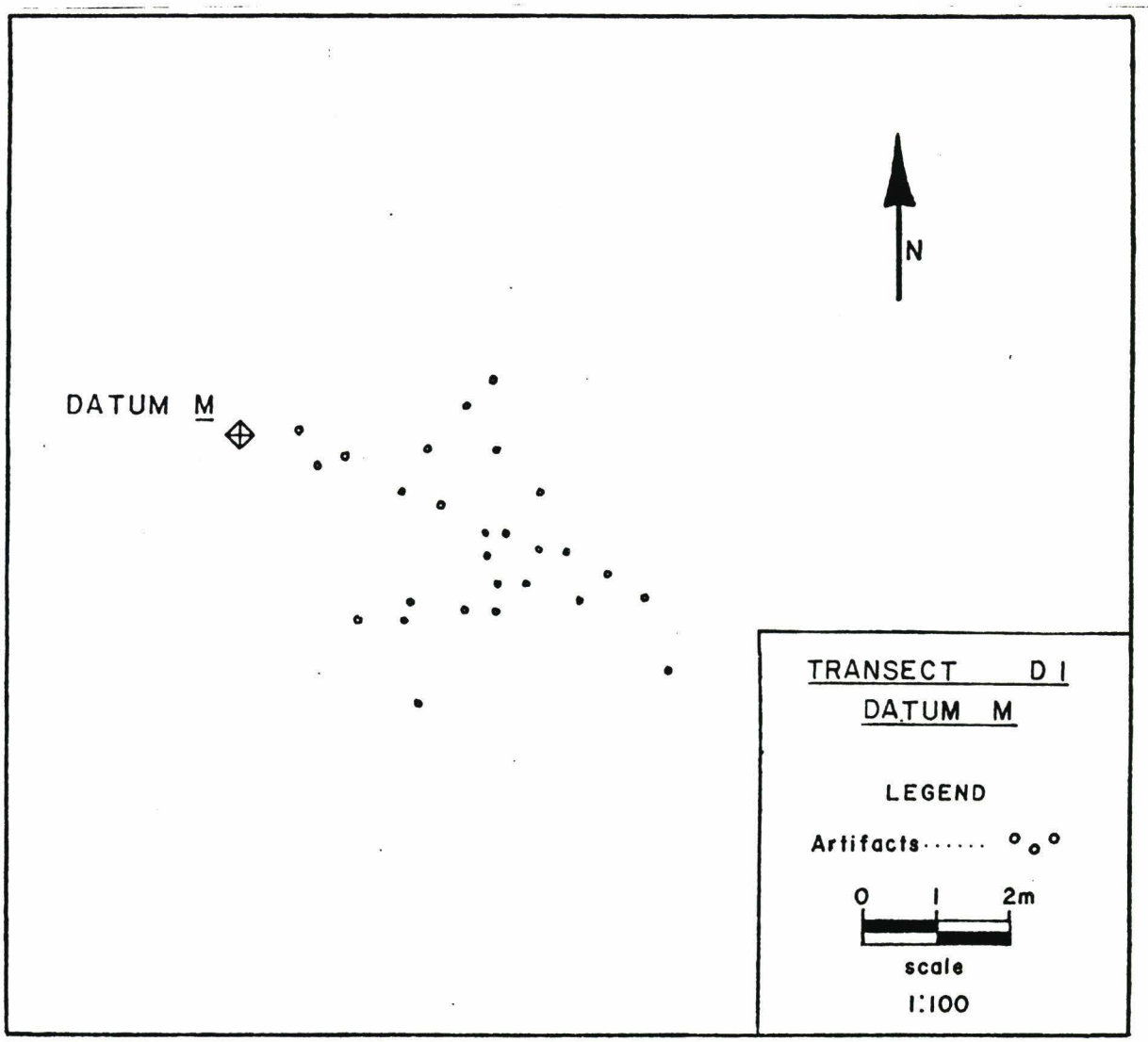

Figure 4. Radiation offset map of Tract D1, Datum M. Artifact numbers have been omitted for the sake of clarity.

Plate 3. Grid collection in Transect D1. View is to the northwest.

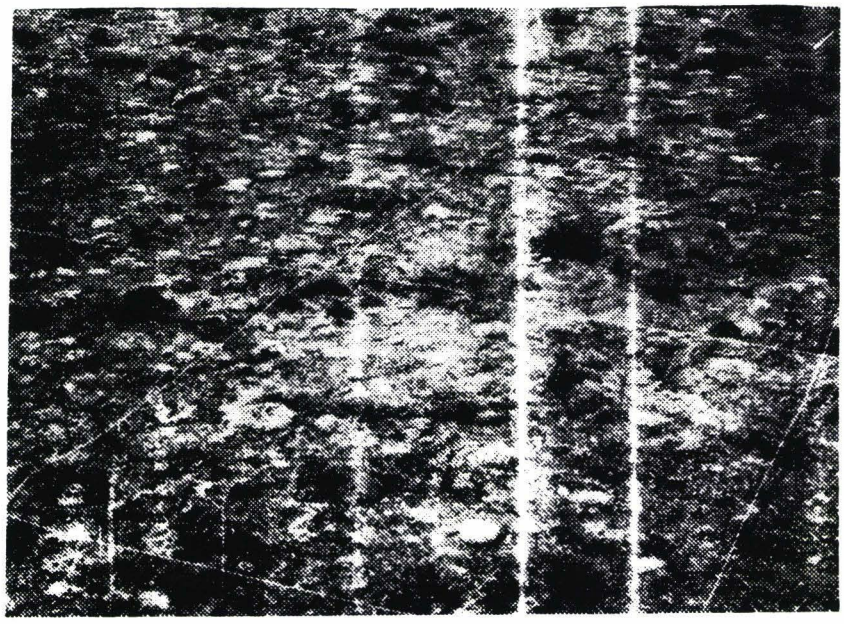

Plate 4. One of the stone circles of transect A1 (Feature #1) associated with artifacts of the Bitteroot Phase. Grid size is 2m.

Collection of Auxiliary Information

Sources of paleoecological information and buried habitation sites were not sought systematically, but when areas with high potential for these appeared they were carefully investigated.

Survey Results

Tracts and Transects

During the monthlong field season, a total of five tracts including 27 transects were studied averaging approximately 12,000 m^2 in area. Each tract and the transects included within it are described briefly below along with a summary of the kinds of archeological manifestations found. Analysis of the artifacts has not yet begun. Therefore, when kinds of tools and phases in the local chronology which they represent are mentioned, knowledge of their presence is based solely on impressions gained by field observation, not on hard facts. Phase designations used here were defined by Swanson and others (Swanson 1972; Swanson, Butler, and Bonnichson 1964; Swanson and Bryan 1964; Swanson and Sneed 1966) for the Birch Creek and Salmon River Valleys and are based on stylistic elements and in part on ecological adaptation. Their applicability to the Pahsimeroi Valley has not yet been demonstrated and they are used here merely as gross temporal indicators.

Tract A. This tract is located where the Pahsimeroi River breaks from its mountain canyon into the open alluvial plain. The area included is a circle of one km radius centering on the confluence of the Pahsimeroi River with Mahogany Creek. The area includes such topographic features as the river and stream bottoms, consecutive alluvial terraces, glacial morraines, the broad alluvial flat and slopes, gullies, and ridges of the mountains. The entire area is included in T. 10 N., R. 23 E., Sec. 11.

Transect 1: This is a 300 by 80 m eliptical remnant of the third terrace level which stands directly above Mahogany Creek and the Pahsimeroi River.

Finds in Transect 1 include a set of five or more artifact clusters including one from Swanson's Birch Creek phase (postglacial to approximately 7000 BP; two from the Bitterroot phase (7000 - 3000 or 4000 BP), one of which includes two 6-meter diameter stone circles (pl. 4); and two representing the later Beaverhead phase (3-4000 to ca. 2500 BP). All clusters are large and relatively dense, contain such objects as "scrapers," "knives," "projectile points," and large amounts of chipping debris, and appear to represent domestic sites. (Location: T. 10 N., R. 23 E., Sec. 11, NE corner of SW¼).

Transect 2: Two 10 by 30 m eliptical remnants of the first terrace above Mahogany Creek exist here. One terrace contains a dense cluster of the Beaverhead phase and is similar to clusters from Transect 1. The other terrace has but a few scattered worn flake tools (Location: T. 10 N., R. 23 E., Sec. 11, NE corner of SW¼).

Transect 3: This is a linear transect 50 by 55 m trending northwestward from above Transect A1 and crosscutting the 4th, 5th, and 6th terraces above the river, and early Wisconsin glacial morraine and part of the alluvial plain.

Finds included a fallen down rock cairn at the streamward edge of terrace 4, a few tin cans near jeep trails across this terrace, and 2 small clusters of less than 10 flake tools including knives and scrapers believed to represent the Bitterroot phase. The surface of terrace 5 had a small Euro-American campsite and a single worn flake tool. (Location: T. 10 N., R. 23 E., Sec. 11, NW¼).

Transect 4: Another linear transect on the south side of the Pahsimeroi River 50 m wide and 300 m long crosscuts the third terrace above the river, a mountain slope and gully. A short extension off the upper end of the transect included a ridge saddle and part of a morraine crest. Artifacts were sparse and included a single core and associated flakes in the gully area, several small stone flakes and rifle shells on the morraine ridge and a Euro-American camp with associated trash in the high saddle. (Location: T. 10 N., R. 23 E., Sec. 11, north side of SE¼).

Transect 5: This is a 100 by 100 m westward extension of A4 to cover a part of the surface of the third terrace. Finds included only scattered, impact fractured projectile points and worn flake tools. (Location: T. 10 N., R. 23 E., Sec. 11, NW corner of SE¼).

Transect 6: To determine if the lack of artifacts in A4 and A5 on the third terrace was general, a 355 by 30 m downriver extension of this terrace was searched and produced a single shotgun shell. The third terrace mentioned for A4 - A6 lies opposite the terrace of A1 but is much farther from the river itself. (Location: T. 10 N., R. 23 E., Sec. 11, NE corner of SE¼).

Transect 7: This 100 by 150 m wedge-shaped transect covers second and third terraces above Mahogany Creek (the first terrace is under 10 m wide here) upstream from all other transects. The second terrace contains upwards of seven small (10 m diameter) clusters of 10-20 artifacts including projectile points, flake tools, and scrapers. These represent Bitterroot, Beaverhead, and possibly also the later Blue Dome (500 BC - 1250 AD) phases. A single large domestic cluster (see A1) of Beaverhead or Blue Dome age is also present. The third terrace contained only a few scattered worn flake tools and impact fractured projectile points (Location: T. 10 N., R. 23 E., Sec. 11, NW corner of SW¼.)

Tract B. The second tract studied lies in Horse Heaven Pass within a 1 mile radius of the point at which Horse Heaven Pass road crosses the Challis National Forest boundary (T. 11 N., R. 23 E., Sec's. 3, 4, 10, and 11) (pl. 1). Topographic features included are the alluvial fan of the pass floor, a highland spring, narrow waterless canyons, lower mountain slopes and ridges, and channels of intermittent streams crossing the open plain.

Transect 1: The area surrounding Mudspring, a transect of irregular shape is approximately 150 by 200 m including steep canyon slopes, surfaces around the spring, and the spring bog itself (pls. 5 and 6). This is a "developed" spring so the terrain has been altered by heavy equipment and the tramping of cattle.

Artifacts were densely clustered around and within the spring bog. Included were projectile points, large cleavers, scrapers, knives, cores, mainly small waste flakes and large, well worn flake tools. Phases represented were Birch Creek, Beaverhead, possibly Blue Dome, and the Lemhi, following the Blue Dome phase, represented by desert side notched projectile points. Euro-American artifacts were mainly tanks, pipes and fences associated with spring development. (Location: T. 10 N., R. 23 E., Sec. 9, SE corner of NE¼).

Transect 2: Transect two was located on the open plain crossing two different alluvial fans and a confluence of now intermittent streams (pl. 1). Finds included a single impact fractured projectile point and one worn flake tool near the stream channels, and cans and bottles adjacent to Horse Heaven Pass road. (Location: T. 10 N., R. 23 E., Sec. 3, NW corner of SE¼).

Transect 3: This doglegged linear transect includes one north-south section of 350 by 40 m in size which crosscuts two broad, intermittent stream channels, the terrace between them, and the pass floor and a 100 by 20 m section southeastward up the mountain slope. Only one worn flake tool was found in one of the stream channels. (Location: T. 10 N., R. 23 E., Sec. 4, E½SW¼.)

Transect 4: This is a small (100 by 50 m) rectangular transect designed to sample the interface between mountain and open plain. It crosscuts the base of a mountain slope, intermittent stream channel, and the alluvial flat. Cultural material consisted of an impact fractured projectile point, one worn flake, and a plastic drive-in mayonnaise cup. (Location: T. 10 N., R. 23 E., Sec. 4, NE corner of SE¼.)

Tract C. This area contains the lower basin of Mahogany Creek from 2 km above the Pahsimeroi confluence to 7 km above (T. 10 N., R. 23 E., Secs. 10, 15, 16, and 21) (pl. 2). Included in this area are the stream channel

Plate 5. Mudspring (center), location of Transect B1. View is to the east onto the valley floor.

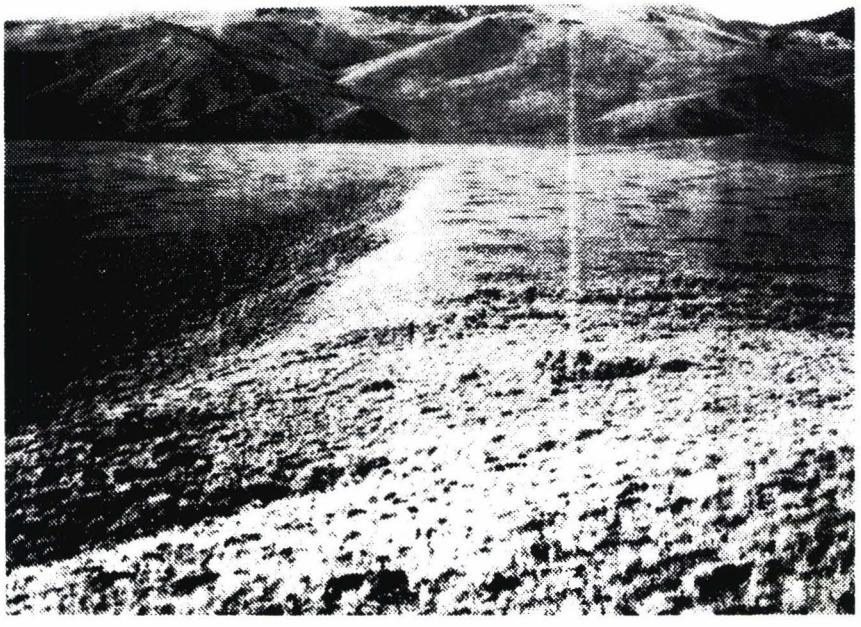

Plate 6. The vicinity of Transect D3 looking northeast toward Donkey Hills.

both in the open plain and mountain canyon, associated terraces, morraines, mountain slopes, dry tributary channels and terraces, and a large area of ice karst topography.

Transect 1: A linear 300 by 50 m transect extends northwest from the bank of Mahogany Creek, across a series of four terraces and onto the surface of the alluvial plain. On the first terrace above the stream were a few scattered worn flake tools. Terrace three contained a Euro-American camp with fireplace, single edge razor blades, bottle caps, and tobacco cans with associated bottles and cans. On the surface of the alluvial plain near the slope to terrace four was a similar camp beside a jeep trail. (Location: T. 10 N., R. 23 E., Sec. 10, SW corner of SE¼.)

Transect 2: This curvilinear 50 by over 200 m area crosses ridges and basins of ice karst topography. A single beer bottle cap was found. (Location: T. 10 N., R. 23 E., sec. 10, NW corner of SE¼.)

Transect 3: Placed on the first and only terrace above Mahogany Creek within its mountain canyon, this 50 by 150 m transect covered the terrace surface and base of the mountain slope. Two scattered stone flakes were found. (Location: T. 10 N., R. 23 E., Sec. 12, NW corner of NE¼.)

Transect 4: This transect was searched largely as a double check on earlier findings. It extended for 3.5 km at a width of 5 m and covered a large area of ice karst topography, the morraine slopes above the karst area, the alluvial plain from a late Pinedale (?) glacial outwash channel and terraces adjacent to the channel and the crest of an earlier Wisconsin morraine.

No artifacts were found in either the ice karst area or outwash channel terraces. One impact fractured projectile point tip appeared on the first mentioned morraine slope and on the high point of the older morraine was a rock cairn around which were several unworn flakes, a stone knife, a collection of boards with round nails, several rifle shells, and a table knife. (Location: T. 10 N., R. 23 E., Sec. 16, NW¼.)

Tract D. This tract contains the lower basin of Burnt Creek from its confluence with Long Creek in the alluvial plain to its second mountainward tributary, an area of 19 km^2 (T. 10 N., R. 24 E., Secs. 5, 7, 8, 17, 18, 19, and 20.) The channel of Burnt Creek, its terraces and broad alluvial plain, narrow tributary canyons, barren mountain slopes, saddles and ridges, and several small upland springs are included.

Transect 1: This east-west linear transect 350 by 50 m in size cover an area from the east bank of Burnt Creek out into the stream's relatively level alluvial plain (fig. 3). It is located approximately ½ km downstream from the Burnt Creek Canyon mouth. Artifacts which were found included a dense cluster extending 200 m along the streambank and

30-40 m out from the bank. Apparently a domestic site, the cluster contained predominantly chipping debris and cores, with lesser numbers of projectile points and worn flakes. Fire broken rock and animal bone were common in this Beaverhead, Blue Dome phase site. Two of the artifact concentrations were found at a distance of 80-100 m from the stream and included only tools representing some sort of specialized activity locus (fig. 4). Aside from these manifestations, a few scattered worn flake tools were found the entire length of the transect as well as a number of shotgun shells and beer bottles near the stream itself. (Location: T. 100 N., R. 24 E., Sec. 8, South side of NW¼.)

Transect 2: Roughly L-shaped, this 20 by 800 m linear transect crosses a narrow tributary canyon with a small spring fed stream and follows a mountain ridge crest to its summit. No artifacts, save one tin can, were found in canyon walls or stream bottom. The ridge top produced rifle shells, beer bottles, and a core, all separate. On the ridge summit were two roughly square stone cairns around each of which were scattered a few unworn flakes and a core or two. (Location: T. 10 N., R. 24 E., Sec. 18, NW¼; Sec. 7, SE corner of SW¼.)

Transect 3: Transect 3 is another L-shaped transect which crosscuts the alluvial plain of Burnt Creek up the scarp to an alluvial terrace, crosses the terrace at the base of a mountain slope covering a 100 by 50 m area, then runs along the terrace edge for another 100 by 30 m stretch (pl. 6). Finds include scattered flakes on the terrace scarp and surface, two impact fractured points at the terrace edge and Euro-American shotgun shells and stove-pipe at the base of the mountain slope (Location: T. 10 N., R. 24 E., Sec. 8, NW corner of SE¼).

Transect 4: The transect is linear and begins on the east side of Burnt Creek 1.25 km below the canyon mouth. At this point the transect is 60 m wide. It then crosses the stream where for a short distance the width is 50 m then it constricts to a 30 m width and runs out across the broad alluvial plain, up a terrace scarp, and across the terrace to its midline. Total length is 300 m.

Two large, dense artifact clusters of domestic type were found on the east side of Burnt Creek. One, beside a now extinct stream channel, is possibly of Birch Creek phase age. The second, beside the present stream bed, is approximately 100 by 30 m in extent and contains such things as intact bone, bison horn, and a food grinding slab. This second cluster represents the Blue Dome phase. The west bank of Burnt Creek includes a loose cluster, possibly also of the Birch Creek phase, extending some 20 by 20 m. Across the alluvial flat are but very few scattered flake tools. At the edge of the terrace and on the terrace

scarp are impact fractured projectile points, large worn flake tools, and a Euro-American roadside camp of boards, cans, and bottles. The open terrace surface is devoid of artifacts. (Location: T. 10 N., R. 24 E., Sec. 8, North side of NW¼.)

Transect 5: To determine if the phenomenon of dense occupation of the streambank continues into the open valley bottom, a small 50 by 75 m plot was laid out on the west side of Burnt Creek near its confluence with Long Creek. In this area, only a few scattered worn flake tools and one impact fractured projectile point were encountered. The main differences between Transects D1 and 4 and Transect D5 are (1) the distance from the canyon mouth and (2) the increase in stream gradient and consequent reduction in vegetation in the latter transect. (Location: T. 10 N., R. 24 E., Sec. 5, NE corner of SE¼.)

Transect 6: Located within Burnt Creek Canyon, this transect covers an area 50 by 300 m from the streambank, across two high terrace remnants and onto a third. No finds were made outside the recent stream floodplain area. An old jeep trail crosses the stream at this point and the area is littered with Euro-American trash and fire hearths. Aside from this material, a few scattered flakes and broken projectile points were found. (Location: T. 10 N., R. 24 E., Sec. 20, NE corner of NW¼.)

Transect 7: This small triangular transect covers the mouth of the second mountainward tributary of Burnt Creek. The area covered is 100 by 150 m and includes a high terrace of the tributary canyon, the floodplain of Burnt Creek, and a low bedrock bench between them across which the tributary flows.

Finds on this bench were widely scattered except for one small cluster of flakes and included a knife, projectile points, and one bottle. On the floodplain, only scattered flakes were observed, and no artifacts were located in other areas of the transect. (Location: T. 10 N., R. 24 E., Sec. 20, SE corner of NW¼.)

Tract E. This tract includes the channel of the Pahsimeroi River, adjacent terraces and alluvail plain from 4 km downstream from the Mahogany Creek confluence to 3 km upstream from the north point of Donkey Hills. The area covered is some 30 km^2. In this instance, most transects cover the same kinds of environments but are placed for coverage of points along the river of different distances from the mountains and at different altitudes. (T. 10 N., R. 23 E., Sec. 1; T. 11 N., R. 23 E., Secs. 36, 24, 25, 13; T. 11 N., R. 24 E., Secs. 6, 7, 18, 19, 30; and T. 12 N., R. 24 E., Sec. 31.)

Transect 1: A linear transect 50 by 250 m on the Pahsimeroi's south side crosscuts the recent floodplain and a series of four consecutively older terraces above the river.

Finds were sparse. Aboriginal artifacts were scattered along the lower terrace surfaces and scarps. A single horseshoe on the third terrace constituted the whole of Euro-American materials. (Location: T. 11 N., R. 24 E., Sec. 36, SE corner of NE¼.)

Transect 2: This transect corresponds to a 100 by 2030 m section of the first terrace above the Pahsimeroi River 4 km below the Mahogany Creek confluence on the river's north side.

A Euro-American homestead with cabin and corral stands just upstream from this transect and consequently many domestic-related objects were located here. Aboriginal artifacts were few, generally scattered, and consisted largely of worn flakes. (Location: T. 11 N., R. 24 E., Sec. 36, SE corner of SW¼.)

Transect 3: Beginning on the third terrace, above E2, this linear 30 by 200 m transect moves from this terrace scarp to the scarp of the fourth terrace, a broad flat area. Several cans near a jeep trail were found near the fourth terrace scarp and a rifle shell and single flake tool were near the third terrace scarp. (Location: same as Transect 2.)

Transect 4: This transect is a 100 by 250 m block in the open alluvial plain some 2 km south and west of the Pahsimeroi. A single flake tool and a few tin cans near a jeep trail were found. (Location: T. 11 N., R. 24 E., Sec. 13, NE corner of NE¼.)

Transect 5: A T-shaped transect on the westbank of the Pahsimeroi River, this area is 3 km above the north point of Donkey Hills. One section, 100 by 20 m, runs along the first terrace above the Pahsimeroi River, including the riverbank. The other extends perpendicular to the river 100 by 30 m crossing the second through fourth terraces above the river.

The first terrace contained two small flake tool clusters with impact fractured projectile points, otherwise, a few scattered flake tools occurred on this and the second terrace. Two Euro-American camps, one on the streambank and one at the edge of the third terrace (beside a jeep trail), included razor blades, tobacco cans, boards, and tin cans. (Location: T. 12 N., R. 24 E., Sec. 31, NE corner of SE¼.)

Artifact Distributions, Land Use Patterns

Although analysis of the artifacts recovered during Phase I has not yet begun, certain patterns in the overall distribution of artifacts and artifact clusters can already be discerned. These are outlined below for both Euro-American and prehistoric aboriginal artifacts initially without consideration of the apparent temporal variations within each broad class of materials.

Euro-American Patterns

The factors which appear to be most important to the distribution of Euro-American artifacts are the locations of roads and jeep trails in conjunction with major water sources. The patterns may be enumerated as follows:

1. Campsites which commonly include fire hearths, tobacco cans, single-edged razor blades, food cans, and bottles are believed to represent livestock herders' camps. These are found along perennial streams either on streambanks or the edges of terraces above streams, depending on the location of the nearest jeep trail.

2. Campsites which are similar to herders' camps but lack tobacco cans and razor blades occur near roads on streambanks, terraces, and in ridge saddles. These may represent brief, hunters' camps.

3. Scattered cans and bottles, usually from beer or soft drinks occur along all roadways in any terrain.

4. Two hunting patterns may be distinguished. Shotgun shells are found along streams or terrace scarps where tall sagebrush occurs while shells from high powered rifles are found along the edges of terraces and on ridge crests and summits.

It may be possible at a later time to develop temporarily distinct land use patterns for the area but for the present the patterns may be considered as taking two forms. First is the herding of domestic animals by pastoralists who place temporary camps along waterways accessible by wheeled vehicles. Second, hunters make extensive use of the area seeking large game from high vantage points and small game in brushy areas along streams and terraces. These latter occupants place their camps in any locations with water or good vantage points which are accessible by wheeled vehicles. A third, somewhat less significant pattern presents itself clearly throughout the area. Drinking of canned and bottled beverages occurred in all environments, although it seems to have been done most commonly along major roadways.

Aboriginal Patterns

In contrast to the transportation and water oriented patterns of Euro-American artifacts, aboriginal artifacts are more closely distributed with relation to topographic environments. Specific types of artifacts and clusters occur not only in association with certain topographic features but also with regard to reocurring relationships of such features.

1. Domestic clusters or "base camps," which include manufacturing refuge, diverse kinds of tools and, in two cases, structural remains, are found only at or near the mouths of major canyons on terraces or alluvial plains directly adjacent to perennial streams.

2. Small activity areas, represented by compact clusters of stone tools representing but a few functions, are located within 150 m of major streams within major canyons or at canyon mouths. These appear to be associated with some form of food processing.

3. At upland springs near the valley bottom are found clusters of artifacts which include large bifacial tools, "knives," "scrapers," broken projectile points, and tool manufacturing debris. Although possibly domestic clusters, these are distinct in content from number one and may be referred to as kill and butchering sites at which some tool maintenance has occurred. This kind of material was found only once in this study but has been observed by the author elsewhere in the Pahsimeroi and adjacent valleys.

4. Intermittent streambanks, perennial streams coursing in the open plain, the edges and scarps of terraces adjacent to broad alluvial plains, and major stream canyons contain a single complex of artifacts, scattered flake tools and impact fractured projectile points. This association may represent scattered hunting and minor animal processing.

5. Cairns, surrounded by scatterings of waste flakes often from a single core, stand on the summits of mountain and morraine ridges, at least near the open valley. Cairns are also found alone along terraces to the south of the Pahsimeroi.

6. Artifacts are conspicuously absent from all mountain slopes, alluvial plains and terraces over 250 m from stream channels, and narrow mountain canyons. Since these features have been less extensively sampled than others, this lack may be due to sampling error.

On the strength of these distributions, a general aboriginal land use pattern may be defined. Base camps, probably seasonal, were located along reliable water sources at the edge of the foothills. The primary activities performed from those base camps were associated with hunting. Sheltered areas along stream channels or terraces were the favored hunting environments. Spring bogs were especially favored as hunting and butchering locations. Finally, high points were used for the placement of stone markers and some sort of activity took place in which tool manufacture played a part.

This pattern is described without reference to time. Several distinct patterns of site distribution present themselves; this interpretation is but one. Birch Creek phase materials, the oldest in the valley, appear only at highland springs and along permanent water courses near canyon mouths.

Of the many scattered impact fractured projectile points found in various environments, none may be assigned to this phase. Unless sampling error is to blame, the adaptation of the people represented by this time phase period was more oriented toward major water sources.

With the coming of the altithermal, the period of drought to which the Bitterroot phase appears to belong, areas of the valley without permanent runoff streams were abandoned. This confined the Bitterroot phase to the Pahsimeroi River itself. Artifacts clearly representing this phase are found exclusively on terraces and banks of this stream. A lowering of the water table and further restriction of the environments suitable for human habitation are suggested. The land use pattern, though confined, is similar to the general pattern described above.

Following the period of drought, habitation and land use is expanded to its maximum extent. The pattern for this period is that initially described and relates to Beaverhead and Blue Dome phases. The Lemhi phase which follows Blue Dome in the local chronology, defined by the appearance of desert side-notched projectile points, is poorly represented in the project area. Manifestations of this phase occur only at the highland spring and at the canyon mouth along one major stream, Burnt Creek. This bespeaks another restriction of the use of the Upper Pahsimeroi Valley.

These differences in prehistoric land use, though potentially the result of sampling error, do suggest that significant changes in subsistence-settlement and land use patterns have occurred over time. Whether the changes in observed patterns are real or artificial, the overall aboriginal and Euro-American patterns do provide the information necessary for micro-environmental stratification of the study area for later phases of this project.

Subsistence and Paleoecological Information

In addition to the artifacts found in transects, a number of sources for subsistence and paleoecological information were located.

Buried sites with features and abundant faunal remains occurred in tracts B, D, and A at Mudspring, Burnt Creek, and the Mahogany Creek confluence of the Pahsimeroi. These appear to represent Birch Creek,

Birch Creek or Bitterroot, and Beaverhead and Blue Dome phases respectively. Unfortunately, no stratified open sites or large rockshelters were located in the area.

Deep packrat middens in all probability representing at least the past millenium, a series of silted-in beaver dams, numerous spring bogs and silt basins, and a small lake were located which have potential for pollen and plant macrofossil studies. Perhaps of greatest significance to climatic reconstruction for recent centuries was the find of stands of virgin five-leaf pines in an area likely to have been the least affected by Euro-American or native American activities. The sizes of these trees indicate that they may be upwards of 1,000 years old.

What these findings mean to the Pahsimeroi project is that (1) information on subsistence and seasonality may be obtained for most phases of occupation of the valley; (2) that the reconstruction of the valley's environment may be possible for the entire postglacial period; and (3) that local climate and ecology over the past 10 or more centuries may be sufficiently studied to provide information on the relative effects of aboriginal and Euro-American land use patterns on the valley's ecosystem. The latter study will be possible through the comparison of the climatic record from trees not affected by lumbering or grazing activities with pollen profiles from areas which have been so affected.

Summary and Conclusions

The Pahsimeroi Valley Longitudinal Subsistence-Settlement and Land Use Project is designed to study development and change in subsistence-settlement systems and the ecological effects of alternative land use strategies. Pahse I of this research, conducted by James C. Chatters of the University of Washington between June 20 and July 20, 1974 investigated the feasibility of successfully studying these problems in the Pahsimeroi River Valley. During that period, the majority of the topographic environments manifested in the Upper Pahsimeroi Valley were sampled through the complete study of 27 transects located within five distinct topographic regions or tracts.

This investigation provided sufficient information for an outline of aboriginal and Euro-American land use and settlement patterns and suggested that as many as four changes had occurred over time in these patterns. Sources of information on aboriginal subsistence and on paleoenvironments in the valley were located and data on climates and environments of the past centuries are especially accessible.

On the strength of these findings, even prior to complete analysis of collected artifacts, it may be concluded that the problems outlined at the beginning of this report can be successfully studied within the Pahsimeroi River Valley. Therefore, plans will proceed for further phases of this study, including additional intensive survey and controlled.

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